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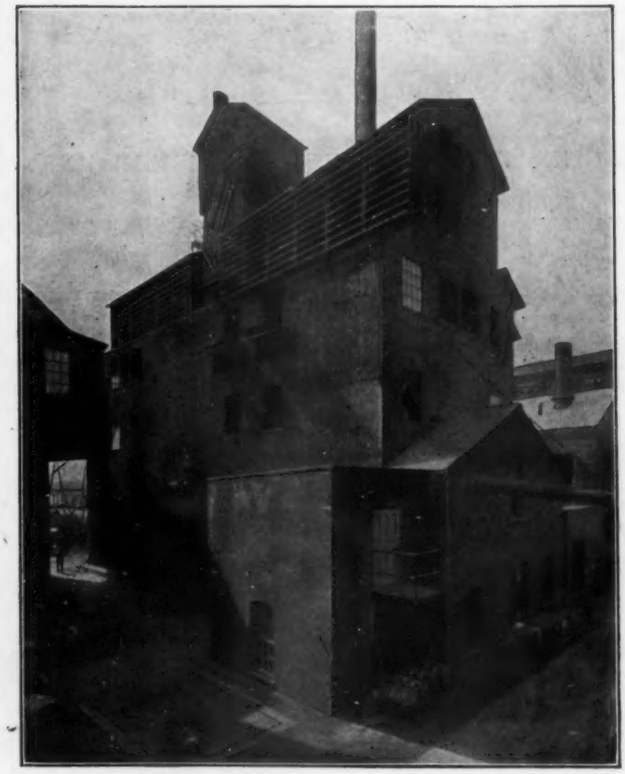

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SIXTY-SEVENTH YEAR

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The Utilization of Gas*

Henry O. Loebell

Vice-President and General Manager, Combustion Utilities Corporation

THE purpose of this paper is twofold: to present some practical viewpoints on gas utilization and its possibilities, and, second, to point out the wonderful opportunities to be found in the gas industry for the young engineer entering into this field of activity.

There is a great deal being said today about the gas industry being in its infancy; that gas is the ideal fuel and must be ultimately recognized as such; that scientific methods are available for the proper utilization of this form of fuel, but they have not been sufficiently applied, etc. What is the foundation for all these claims—such statements are more or less paradoxical and need explanation.

That the trend of industry is affected as a usual thing more by the economic conditions which surround it than by any mechanical improvements which may be developed by science is substantiated by history. In order to account for the present conditions in the gas industry, I will, therefore, attempt to draw a picture of its historical background, showing how the economic factor has been the determining factor in this field as well as in others.

History of Gas Industry in the 19th Century

Let us go back to the beginning of the 19th century, when gas was just beginning to be known as something more definite than the "spirit of coal." During this period it was being developed along two distinctly different lines; first, the use of gas in the home and commercial houses for lighting, and second, the use of gas in industrial plants for heating.

The three basic methods of gas making were introduced during this century, namely, the retort, the producer (invented in Germany in 1836) and the Lowe Water Gas Machine (adopted in 1874), representing respectively the manufacture of coal gas, producer gas and carburetted water gas.

Attention was centered in the utilization of gas for lighting. The original method was demonstrated by Murdock in 1807, who produced light by distilling coal in an iron retort and conducting the gas through copper tubes. In 1885, Robert Bunsen invented the blue flame burner, with which it was possible to burn gas economically with an intensely hot but smokeless flame, and in 1896 Carl Auer presented the world with the incandescent mantle, which is still in use today wherever gas is used for lighting.

The utilization of gas for heating, on the other hand, did not receive the same impetus. Privately and municipally owned gas companies found plenty of business in lighting and seemed content to concentrate their efforts in this direction. Industries requiring flexible fuel limited their use to producer gas, and with the discovery of natural gas grouped themselves around the areas where the supply of this gas was always plentiful and accessible.

The natural gas companies sold their fuel at such a low price that there was little justification in industries seeking equipment to utilize this wonderful fuel with greater efficiencies. It was not until recently that manufacturers came to realize the possibilities of using this gas efficiently, and now the supply has become so limited and the cost so much higher that in the majority of cases industry has been forced to turn to other fuels.

Simultaneously with the growth of the automobile industry, the heating processes of which require a flexible fuel, came the supply of fuel oil from the refineries of the petroleum industry. The impetus that the automobile business as a potential user of gaseous fuel should have given the industry was therefore offset by the use of this by-product which met the requirements very satisfactorily because of its low price and ready adaptation.

*Delivered as a lecture at Johns Hopkins University.

The application of gas for cooking purposes was demonstrated in 1830, but for some years, due to the high price of gas and cost of the appliances, the use of gas cooking devices for domestic purposes was retarded. Since about 1895, as the price of gas has gradually been reduced and the cost of fuel appliances made within the reach of everyone, their use has become general. The public now thinks of kitchens in terms of gas ranges, substantiated by the fact that there are 1,000,000 gas cooking stoves sold yearly in the United States alone.

We find from the above history of the gas industry that during the 19th century consideration for proper utilization of gas as a heating medium was neglected for the most part, and little thought given to wasteful and inefficient practices. Fuel was cheap and plentiful and under these conditions industry does not consider improvements. As a consequence, gas was never exploited in the light of the engineering knowledge which was available. Even today we find examples of equipment, such as old coal forges and other antiquated heating devices, transformed to the use of oil and natural gas by the simple introduction of a pipe with the necessary orifice to give them the symbol of good form. Appreciation of the fact that gas or oil must be burned in specially designed and constructed furnaces to give the highest efficiency and economy was practically lost sight of.

Twentieth Century Conditions

The twentieth century has brought with it a new set of economic conditions for the gas industry. The same economic forces which have tended to retard its development in the past are now working to accelerate its development.

With the lighting business taken over by the electric people, gas for heating and cooking remain as the primary sources of business for the gas company. Because of the decided neglect of this type of business in the past, a thorough readjustment of the gas industry has been made necessary.

The gas company as a manufacturing concern is realizing that its field lies in supplying heat, and with that realizaion has come the responsibility of creating the most economical method of gasifying natural fuels and of educating the consumer to properly use gaseous fuels. The transition, forced as it was by economic forces of competition and development, is not complete even now—there are still remnants of the old function in vogue in the form of legal standards of quality, etc., which must be removed before the way is completely opened up for the universal application of gas for fuel purposes.

For instance, the regulatory standards for candle power and specific B.t.u. for gas are no longer applicable. In practically all states regulatory commissions have recognized this fact. The candle power requirements have been removed and gas is sold on a heat unit basis. The heating value standards, however, have not a scientific basis, but are simply the result of utilizing the heating value which was employed as the standard of quality for old methods of gasification when gas was sold as an illuminant. The tendency of regulatory authorities is to withdraw specified calorific standards and to permit gas companies to manufacture gas of such value as they can make at the lowest cost with the materials procurable and with the lowest capital investment. This will result in the lowest possible price to consumer.

The Colorado Decision

An instance of this is the general order passed by the Colorado Commission which provides that a company shall have the right to make gas of any calorific content that it may be able to manufacture economically. The only requirements are that the gas be of adequate heating quality for the uses to which it is to be put and that the company file with the commission a statement of the character of the gas which it proposes to make and submit data to the commission from time to time to show the specifications are being lived up to. Two other states, Alabama and Washington, have also removed the B.t.u. standard. The universal adoption of such a ruling is one of the objectives of the industry at the present time. Heating value standards are still retained in most states and greatly hamper the growth of industrial and domestic business, whereas if the practice of permitting the sale of gas of unrestricted calorific value was generally adopted, gas companies should be enabled to sell gas at the lowest possible price, thus opening the way for the universal application of gas for fuel purposes for the benefit of all.

Another institution of the old regime of lighting with gas which is presenting a serious problem to the gas industry today is the system of rates under which most companies continue to sell their gas. This system employing the fixed meter charge creates a condition whereby customers who are carried at a loss are a burden to the customers using large quantities of gas, which means that the latter are paying a price which the service they are receiving does not justify. This makes it impossible for the gas company to secure large consumers, particularly in industries where competition is a factor. A movement to substitute a two or three-part rate whereby customers are billed for just what the gas has cost the gas company to deliver it to them is receiving impetus throughout the country at the present time and will do a grea deal towards improving business for the gas industry.

Gas Is the Ultimate Fuel for Heating

In spite of the severe adjustment which has been necessary in the gas industries and the resulting economic problems, the gas companies are on the threshold of a tremendous expansion. Theirs is the ultimate fuel of the future. Natural gas and fuel oil are limited in supply—the fields of natural gas are rapidly becoming depleted, while oil is not only limited in supply, but is becoming more and more expensive all the time, as more efficient methods of

(Continued on page 14)

Training and Compensating Salesmen in Small Towns*

Details of an interesting plan employed by a gas company

L. T. White

New Business Manager, Dominion Natural Gas Co., Buffalo, N. Y.

THE subject encompassed by this rather ambiguous title is a vast one. Perhaps no one yet has a perfect plan of procedure by which they acquire men, train them and then turn out first-class salesmen. However, our company, with 18 years of closely studied experience in this work, has found some facts and has learned some lessons which are valuable.

The human side of the gas industry, I am afraid, has not received the attention it has merited. From my observation, the plant and the mains and the meters are studied more closely and watched more carefully in some companies than the development and the well being of the men and women that go to make up our industry. Mr. Carnegie once said, as he was talking of the comparative value of the material property of his concern and the human organization that he had built up, "If all of my plants were lost over night, I could rebuild them in two years; if all of my organization was destroyed, however, I could never rebuild it." That is true in a way of our industry. It isn't our processes or our patents or our gas-making practices that hold us where we are today, or are going to insure our future, but, in the minds of the men and women, of your company and of ours, lie solutions to all problems that worry us today. And it is through them that our future is going to be better and brighter than perhaps we are able to comprehend now.

Methods Are Important

The ways in which we develop our new and our young employees are to me of tremendous importance, whether they be salesmen or bookkeepers or fitters or drip-pumpers. I would like to say at the outset that our policies as to new business are perhaps a great deal more broad than the term implies. The members of the New Business Department who circulate among our customers, selling gas, gas appliances, settling complaints, adjusting equipment, and in general doing everything to promote the company's interests, are a great deal more than salesmen in the narrow sense of the term. Twenty years ago our company decided to drop the term "salesmen" and to use in its place "representatives." These men are full-fledged representatives of the company in practically every dealing with customers. We insist that they are generally well informed as to the methods of acquiring gas, its manufacture in artificial gas plants, and its discovery in natural gas fields. They must know how it is delivered to customers; they must have a general knowledge also of the company's accounting system, particularly those features of it that the customer is most interested in, such as the method of meter reading, billing and of keeping the customers' ledgers. Naturally, they must be very adept sales people and they must know just exactly why they are selling equipment, how the New Business Department fits in with the company's general over-all scheme of things. This idea seems to me to be one about which argument is futile. A representative of the gas company whose only concern is in that of selling a stove or a water heater is not nearly as effective nor efficient as one who is a representative of the gas company as a whole.

Procure the Man

The first step in developing a representative is to procure him. This is an important matter, for if the proper men are hired and hired properly, lots of mistakes may be avoided, a lot of time, energy and money may be saved by those who are responsible for the training of these men. We rarely are forced to revert to the "Help Wanted columns" of the newspapers. One of the reasons that in small towns or cities of, say, for example, less than 10,000, we always have a waiting list of applicants. Then, again, our men and our executives are constantly watching young men who would make likely material for New Business work. We watch them without letting them know that they are watched. We know of their families, of their habits and of their ambitions, and by the time we are ready to make additions to our department we find that we are able to secure the number that we want from among these men we have been more or less watching. We are quite firmly convinced that married men make the best representatives. They are more settled, a good deal more steady and a great deal more regular as to habits.

Then, again, the responsibility is so much greater that they take their work seriously. In hiring a representative we really and frankly prefer men who have not had previous sales experience. By taking them when they are new to salesmanship we find that we avoid "unlearning" bad habits, poor traits that they may have picked up here and there. We want men to come to us with the idea that they are going to spend the rest of their lives in the gas business. We can prove to them quite readily that it is a profession of which they can be proud the rest of their days. We point out the wonderful future ahead of the gas industry and we instill into them at the outset an enthusiasm and belief in the "game" that helps remarkably.

His First Job

When a man has met our preliminary requirements, has been hired and reports for work, his first job is to polish and dust off appliances on the sales floor. This he does under the direction of either the New Business Manager or the floor salesman. As

*Presented at the Pennsylvania Gas Association meeting, Scranton, Pa., December 7, 1925.

he is polishing and cleaning, the various features of gas equipment are explained to him. He is shown the elementary process of combustion. He learns how a burner works. He sees how an oven is heated. He sees how water circulates as it is heated through a water heater and he learns of the various kinds of room heaters, etc. After these things are explained to him, he is invited to ask questions freely and frankly; we are always afraid of the man that never has any questions to ask. And then, after he begins to learn of the theory of these appliances, while he is cleaning them, he gets pretty much into the feel of things.

Reading the Literature

In spare moments he reads catalogues, descriptive literature, trade journals, any sort of publications that tell of the business or appliances. Next he is introduced to the sub-executives of the local company. By the time he has reached this far he is quite well versed on the aims of the New Business or Sales Department. He knows what they are trying to do. The secretary or cashier tells him of the work of his department. He explains why a meter application should be filled out correctly. He tells him of the reasons for a meter deposit, shows how the meter readings are entered in the books, how the bills are computed, and so on through those transactions that the customer is most interested in. He meets the superintendent or the man in charge of operations. He shows him how gas is acquired and how it is delivered, and some of their operating problems. After he has made these rounds, unhurriedly, he is assigned to an old and a tried and true outside man.

For several days he works with this man from door to door, from house to house. He does nothing but listen. When he has become, in his own mind, pretty well versed as to the method of handling canvass calls and sales calls, he is allowed to talk himself. After each call, the older man carefully coaches him so that mistakes made will be avoided in the next interview. Each night as he returns to the office he reports to the New Business Manager, who asks him of the things he learned during the day, and he, too, carries on the coaching.

New and Unique Part of Course

Our new man is now about ready to receive the part of his course of instruction which is really new and unique. This phase of his development is based on the fact that we are not selling gas nor gas appliances, but we are selling the work that they will do when combined. It is our belief that our representatives will do a better selling job if they will see for themselves through actual work the marvelous benefits of gas fuel. We build up real enthusiasm and a fine conception of what the gas business is doing for the public by teaching each representative to cook.

The new man is given one of the new modern ranges, for instance, to play with. It is connected up, ready for use, like it would be in anyone's kitchen. First, he is taught to bake a plain cake, then an angel food. He learns how to handle a roast and how to fry and to stew and to broil. As he goes through this schooling we drill into him how much more difficult the job he is doing would be, for example, if he was using a coal range. He sees for himself that a modern gas range does about all of the thinking for any cook, that about all that is required nowadays is to follow the directions provided in any cook book, place the concoction in an oven, set the regulator at the desired temperature, and then forget it.

This idea has worked out in actual practice far better than our fondest expectations. Our men are able to go into the kitchens of our consumers and talk at least intelligently about baking and cooking, etc. The housewives place greater confidence in them as a result, so that naturally when they come to the point where they are going to buy a new range they place the order with our men who know more about their problems and their work than anyone they have ever talked to. When the various steps outlined have been carefully and thoroughly negotiated by our new representative he is ready to be assigned to his territory or district.

Working the Territory

The routine that our new representative follows after he has been assigned to his territory is still another subject and one so large that treatment of it is impossible in this paper. We do, however, have a set of rules and plans that the man follows day after day, week after week, as he works the territory. These plans greatly enhance his development and his success because they are tools or weapons with which he can go out and assure himself of a very decent income with a minimum of worry on his part. However, that subject should not come under the heading of training and so we will pass it thus briefly.

The training of our representatives literally never ceases. We are firmly committed to the policy of unceasingly trying to improve the work and the ability of every representative. A man's productivity is very much of a variable. Apparently they never stand still. They either get better or they get worse. When a man has been put through the preliminary and elementary schooling and is assigned to a territory, he has cost the company a sum of money. The longer he is with the company the more he should be worth. Consequently, we use methods which tend to improve him.

The Morning Meeting

Each morning a general meeting is held of all representatives, all members of the New Business Department. This meeting is conducted by the New Business Manager. The New Business Manager is the only one permitted to address the meeting without rising. All representatives and all members of the department taking part in the discussion do so from their feet. We have had some very gratifying results from this little practice, for our men, first,

should be able to talk to 20 people as easily and as readily as they can talk to one. The practice that our men have had in our little morning meetings has proven very valuable to them. Speaking or talking comes as a result of practice, just like playing golf.

In these morning meetings, the previous day's business is reviewed. First, the sales of each man are reported. He describes the appliances that the new equipment replaced. He tells of the hardest resistance he had to overcome. He describes to the other men the arguments he used to overcome it. If he was unable to meet these objections and to close the sale, the New Business Manager points out to him and the rest of the men how this may be done thereafter. When each man has given his report and his experience, the New Business Manager sums up the day's results, tells of their progress towards accomplishment of immediate aims, such as campaign or special sales, and then points out how the whole thing is pushing along towards the big aims of the department. Then the meeting is adjourned. We try to time these meetings so that they do not last over 30 minutes. A great deal of thought is spent by the New Business Manager to make them snappy and entertaining. We find that when our men leave the office and go out on their territories that they are wide awake, had a laugh or two, feel good natured, and are in trim to do a good day's work.

Night Meetings

In addition to the morning meetings, we hold a regular meeting one night a week. This meeting is to take up subjects which could not be classed under a routine heading. Most of these meetings are devoted to the study of the science of salesmanship, and, gentlemen, may I add here, the more you study this art or profession or trade, whatever you may call it, the more you are impressed with it. Salesmanship to me is one of the most fascinating subjects in the universe. We must know more of it and each of us must be better salesmen as we go on in this life if we are to succeed. Our men take very eagerly to this work. Just how they study this art is another large subject and I am going to avoid that. It is sufficient to say that they do study salesmanship, first, elementary, and second, from the psychological point of view. This little scheme works wonderfully. The meetings usually run from 6:30 until 8:30, but most of them are still going at full blast at 10:30. The fellows seem to like it so much that they just hate to quit.

General Meeting of All Employees

In addition to these two meetings, which are more or less confined to the sales department itself, the company holds a general meeting of all employees each month under the heading of the Doherty Men's Fraternity. These meetings are very similar to New Business meetings except that they are on an entire company basis, rather than one department. Each department is given a place on the program to lay before the other employees constructive criticism as well as problems or discussions of any aspects of the business. These meetings are made far more effective because of the fact that executives of the company refrain from holding offices. They, of course, always attend these meetings so as to be there to answer any questions that may be beyond the lay employee. We find that in this frank and open and free discussion of the company and its policies untold good has come to all. After all, you know the company is not something that is cold and hard and intangible, nor is it anything that is mysterious or secret or deadly. It is just as Webster says, a group of human beings banded together to accomplish a given task. We like our employees to talk of it as we, rather than the company. We build up their own initiative. We want their suggestions and we want each one of them to feel that they are just as much a part of the company as any other member. It is surprising to see how these methods build up morale and esprit de corps.

Therefore, to sum up our methods of training representatives, you will see how hard it is for me to give you a definite and decided outline of the procedure that is followed because, like the man setting out to write the story of his life, he wrote the title "My Life," and then, to make it more accurate, added the words, "To Date." Our methods of training representatives have never been completed because we have never had a complete course. We are at it every day and we are never going to stop.

Compensation

Compensation of New Business representatives is accomplished through various plans and schemes. There probably are as many of them as there are hairs on my head, and that is about 50. Compensation is the lever through which tasks are accomplished. There are as many different forms of compensation as there are tasks to accomplish. If a representative is going to do the work that he has been trained to do and do it well, you can see that he is going to have to put all of his mind on his work. A man's compensation, first, should be such that his worries about his income during the day are nil. Naturally, he will be paid through a commission scheme. So that he won't be fretting about the rent and the butcher and the baker and the candlestick maker, we think that a drawing account is a good plan. There is a decided curve in gas appliance sales and so that the men's incomes can be made more even, in many properties we are settling commissions on a three months' basis, making a man's drawing account adequate enough to take care of his expenses. Naturally, this drawing account is adjusted to his ability to earn and may be readjusted as the man's ability increases.

In drawing up a scheme of compensation this thought must always be uppermost in the minds of those that are doing the designing. The sale of gas stoves and water heaters and other appliances is incidental. Paying New Business representatives only for the merchandise they sell is like paying a doctor only for the gasoline he uses when he calls on you. I feel that he should be paid for the amount of gas that he sells as well as the merchandise.

(Continued on page 12)

GAS MERCHANDISING

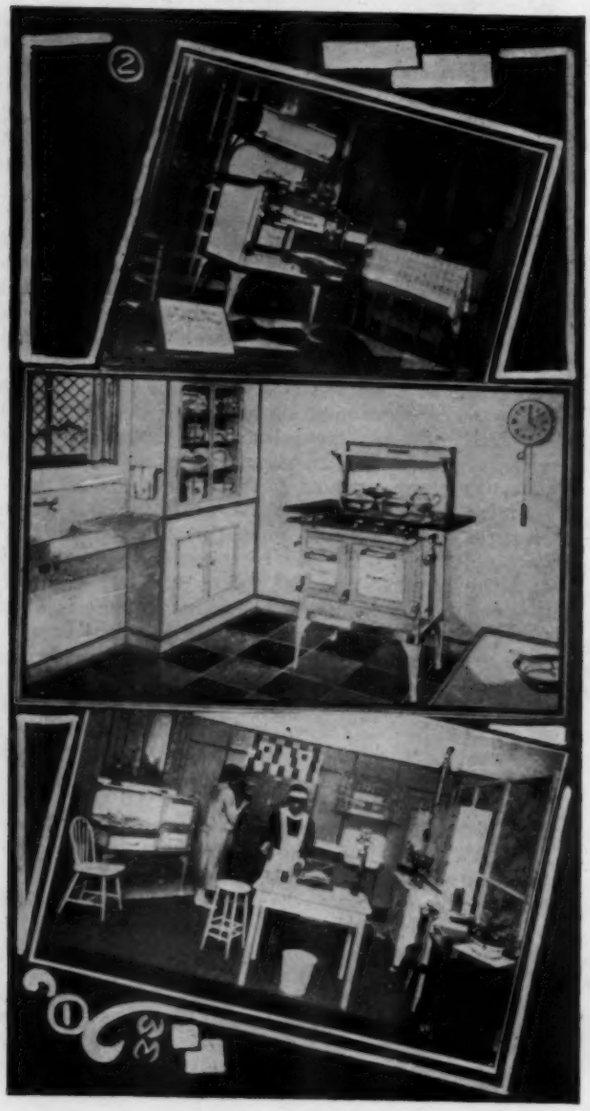
Domestic – Industrial

Ideas for the Man Who Sells

William H. Matlack

A WORD REGARDING DISPLAY

DON'T let anyone tell you that the domestic load is safe and that henceforth all your effort should be applied to new industrial uses for gas. The domestic load is safe only as long as you keep everlastingly exposing new and better appliances to the home manager. Display ranges and water heaters of the latest and best type and design in actual use. Display them in a model kitchen, display them in your windows and display them tastefully on the floor of your store.



Displaying ranges and water heaters, especially the attractive ones that are on the market today, is not a difficult task. Just glance at the display used recently in the window of the Portland (Oregon) Gas and Coke Company (shown in the top illustration). It contains one white enameled range, a table and a chair with a simple latticed background. But do you doubt that one-sixth of the shoppers did not stop and look?

Now glance at the center photograph! Show it to any home manager who enters your store, hear her exclaim, "Oh, isn't that a beautiful kitchen." Here is your cue. Get a carpenter to erect a model kitchen along the lines of this simple, dignified one.

Once more—do you insinuate that there is a woman in Mount Vernon, N. Y., that would not take great pleasure in sitting-in on one of Miss Julia A. Coles' Home Service Demonstrations, who would not delight in viewing Miss Coles' work and envy her such an ideal workshop? This kitchen, as may be seen, contains a modern gas range and a storage water heater and all the other fixings that go to make up the up-to-date "heart of the home," and should serve as a model for anyone who is seeking ideas for a model kitchen.

A SUCCESSFUL SALES DRIVE

S. C. SCHMUELBACH, sales manager of the Illinois Power and Light Corporation, East St. Louis, Illinois, has been making a drive on the full lines of appliances sold by that company during the month of December, with the result that many sales of appliances have been made for gift purposes. Many East St. Louis home managers will receive from "Santa himself" an appliance gift this Christmas. The East St. Louis company added as an inducement to Christmas buyers "A Thirteen Piece Whole-Oven Aluminum Cooking Set FREE" with each oven heat control range purchased during the month of December. A special low-down payment was also a feature in connection with the company's holiday selling. In no instance was the customer required to make a down payment of more than $10.

All ranges were sold on the $5 down payment

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INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 101

Combustion

Ignition Temperature

The importance of the kindling or ignition temperature is very well illustrated by the example of making a coal fire in a coal stove. First a match is rubbed and the sulphur chlorate of potassium mixture in the match is ignited. This reaction takes place because the kindling temperature of this mixture of chemicals is reached due to the rise in temperature which is caused by the heat that is generated by friction produced by rubbing the match against a surface. The heat of the burning sulphur ignites the wood of the match. The flame thus produced is used in lighting the paper. The ignition point of paper or straw is low enough so that the heat in the burning wood of the match is sufficient to bring about combustion. It is a fact that this heat is not sufficient to ignite the wood. But the heat in the burning paper under the pile of wood is enough to bring the temperature of the wood to such a point that it is capable of uniting with the oxygen in the air. The result is that the wood bursts into flame. On the other hand, the heat in the burning paper cannot ignite the coal or coke which is piled on top of the wood.

CHARACTERISTICS OF COMBUSTION
Combustion Reactions take place at definite reaction weights.
Thus: –
Pure Charcoal (carbon) 12 pounds will burn in
Cylinder of Oxygen 64 pounds
OXYGEN
Coal
Wood
These Combustibles contain mixtures of combustible elements and compounds.
For combustion to take place, ignition temperature must be reached.
Match
(1) Combustible mixture of Sulphur and Potassium Chlorate
(2) Heat of Friction Ignites Combustible Mixture.
(3)
Heat of Mixture ignites wood of Match.
(4) Heat of burning match ignites
A – Paper
B – Wood
C – Coal
Coal
Wood
Paper
Lighted match
Each combustible to Burn, that is, to unite with Oxygen, must first be heated to its Ignition Temperature.

Igniting the Coal

The ignition of coal or coke is a much more difficult matter than that of either paper or wood. It takes quite some time before the coal is raised to a high enough temperature so that it takes fire and burns. Sometimes, when insufficient wood is used in preparing the fire, the coal refuses to ignite. This is simply due to the fact that its temperature was not raised high enough for the carbon and other combustible elements in the coal to unite with the oxygen in the air and burn. Then, again, it is necessary that the heat contained in the wood, that is, in the form of potential heat energy, be released quickly. A slow burning wood fire will not ignite the coal or coke. The draft of air that passes through the fire serves to accelerate the combustion of the wood, so that a great deal of heat is released

within a short period of time and the result is that the temperature of the fire is raised to such a point that the coal ignites and burns. Then when fresh coal is piled on this fire the process is repeated, but no additional wood need be used. The heat in the burning coal is now sufficient to heat up the fresh coal and bring it to the ignition temperature. However, if the fire is allowed to die down too far, then a point will eventually be reached where the heat in the fire is not sufficient to keep the coal burning and eventually the fire is extinguished.

Problems in the Gas Industry*

The president's address at the 1925 Pacific Coast Gas Convention

E. L. Hall

Portland Gas & Coke Company, Portland, Oregon

OUR association during the past few years has greatly broadened the scope of its activities, and has attempted through an organization of committee work to make careful and systematic studies and reviews of the technical and commercial phases of the industry, and to point out the consensus of opinion regarding good practice. It is also true that such reviews have largely superseded individual expressions of opinion. It would seem, therefore, not alone needless, but somewhat presumptuous for any one of our members to attempt to lay before you authoritatively the present status of our industry.

At the same time, the greatly increased activities of our association have raised many perplexing problems for the consideration of your officers and directors. Many of these problems are as yet unsolved.

Aim of Association

The very idea of an association presupposes cooperative efforts. It does more than that; it means combined efforts.

The aim of our present committee organization is to organize little groups of men in our industry, who are interested in similar problems, and to promote not alone organized research, but exchanges of opinion and dissemination of information. It is contemplated not alone that the best minds of our industry should be put to work, but that all the minds should participate. Much progress has been made in attaining this ideal, but much remains to be attained before it can be truthfully stated that every man in the association is at work, according to his ability and experience, on the problems of our industry. That such a desirable condition may be brought about, we must not alone interest each individual of the association, but must secure the support of the executives of the companies and utilities comprising our association. It is sad, but true, that men in any kind of work must be stimulated and be given an incentive. There is not at the present time sufficient inducement of this kind. Unfortunately, too much is left to the individual inclination of employees, whereas it would seem to be as much a proper duty of our executives to supervise association work as to direct the other activities of their companies. This is true not from any altruistic reason, but from sound business considerations.

Work for Future

In order to forecast what our association will have to do for the industry in the near future, one is of necessity compelled to see what lies ahead of our industry. In this day of voluminous reading matter, the numerous and not altogether fanciful pictures that have been drawn concerning the future fuels of industry, cannot have escaped the attention of our members. Let us try to visualize at least one of these pictures—the picture of the smokeless city, where the homes are heated with gas, and the industries have found increased production and cleaner working conditions through the exclusive use of our commodity. What would such a condition mean to any city such as we are in today, the city of Portland, a city of 350,000 inhabitants, containing 85,000 homes, factories, stores and workshops. It has been computed that if all these places were heated with gas it would require not less than 220,000,000 cubic feet on the maximum day. And, further, if the industries now using solid fuel and oil were converted entirely to gas, an additional output of 45,000,000 cubic feet would be reached. The combined output for all reaches the stupendous total of 265,000,000 cubic feet per maximum day, an amount of gas which would nearly supply the entire Pacific Coast under present conditions.

To take care of such sales of gas, the gas plant would by necessity have to be ten times its present size, requiring an invested capital of over $125,000,000.

The question will be heard, "Is this dream possible of achievement?" "Could such sales of gas be realized at our present costs of service?" To answer this question it will be necessary to consider somewhat the present nature of our business.

Present Condition of Industry

It is unfortunately true that while the sales of gas are large in the aggregate, yet the amount of gas sold to the individual consumer is a ridiculously small amount, and at the same time prices for our commodity are high as compared with other fuels. It must be realized that this condition of small sales per consumer is largely responsible for such prices.

(Continued on page 16)

*Presented at the thirty-second annual convention of the Pacific Coast Gas Association.

As The Journal Views It

THE YEAR 1925

Although it is customary for gas men to analyze the progress and record developments in their industry during the fiscal year which ends yearly with the annual convention, nevertheless, when the calendar year comes to a close, it is generally customary for all men to review—so to speak—the work done in the past twelve months. So it is with us of the gas industry.

The new year has now begun; the old year has passed into history. It is interesting and instructive to look back and see just what has been done in the past twelve-month and what real progress has been made during that period. It is only by making such analyses that one can arrive at any correct conception of one's abilities and as to whether or not one is working and progressing in the right direction. Self-analysis, to be sure, is not a method to be recommended for frequent practice, but the ancient Greek philosopher whose saying "Know Thyself," has come down through the ages, knew well that unless a person understands his own shortcomings and capabilities, it is really impossible for him to make much progress in any undertaking.

We believe that the gas industry "knows itself." We believe that gas has found itself. We feel that during the past twelve months gas has made great progress, and particularly in one respect. Up to very recently the talk of gas men has been regarding what the industry can do if it makes up its mind to exert every effort in a certain direction. The talk has dealt with the future of gas and the great rewards that are held out to the industry if it will acquire the courage and expend the energy to work toward a great goal. Today, however, there is not so much talk of the future, not because the future is no longer as bright or as promising, but simply because some of the accomplishments which have been assigned to the future have been effected in part in the present.

This is what we mean when we say that the gas industry has found itself. Its industrial business is now large. House heating is no longer talked of as something to do in the future or something not to do because of its peculiar characteristics and somewhat difficult surrounding conditions. House heating is a thing of today. For gas is being sold for house heating purposes in a great many cities and towns, even by the comparatively small gas company, and one finds now that the smallest companies are considering it seriously.

Thus we see that the entire aspect of gas has changed. We feel that this has been accomplished within the past twelve months. Gas has surely found itself and this process has been as labored and as difficult as that described by Kipling in his famous story of the ocean steamer finding itself on its maiden voyage.

We can now look to the future with more certainty than formerly. We have taken the first steps in the path to our goal and they have been successful ones. To be sure, what we are doing now, the methods that are being employed may not be the final ones. Changes may be necessary but fundamental principles have been well established and more than anything else gas men have acquired experience in new lines and have found out for themselves what others have been telling them in a more or less theoretical manner, that if they once determine to get business of a character that is new to them, but nevertheless essentially well suited for gas, they will not fail.

Thus, 1925 has been a year of great importance to the American gas industry. When we are five or ten years older and look back upon it, we will then see even more clearly that it formed the turning point in our industry, the period within which the gas man begun in earnest to secure new business for their companies in fields which, while they were always suited to gas, were nevertheless neglected and allowed to remain untouched because of their apparently too great difficulties.

From now on progress cannot but help being rapid. From now on there will remain absolutely no doubt in anybody's mind regarding the future of gas. It is necessary now merely that all gas men determine to work, as they never have worked before, to develop the industry and to make the foothold that has been secured in these new fields so strong that it can never be shaken loose, that it will form a real impregnable foundation on which to build the greater gas structure of the future.

OUR PROGRAM

In addition to continuing the special features that have formed an essential part of the Journal for 1925, the American Gas Journal will publish, during 1926 a number of serials on various phases of the gas industry. Amongst these will be mentioned a serial on the Education of the Gas Man, by E. B. Luce of Baltimore; one on Low Temperature Methods of Carbonization, by A. C. Fieldner; one on Industrial Gas and Its Raison d'Etre, by A. B. Greenleaf of Chicago. There will also be started a serial on the problems of the small gas plant. It is the purpose of the Journal to pay particular attention to the small gas plant and articles have been solicited from gas men who are concerned with the operation of small gas works.

Departments Continued from 1925

1. Industrial Gas Lessons

They will deal with the principles of the combustion of gas, and the calculations involved in the use of gas in industrial furnaces. They will also be concerned with calculations involved in the uses of gas fuel in individual industrial heating operations.

2. The Progress in Gas Technology

This department, inaugurated especially for the technical man, will continue to keep him in touch with technical developments in the gas industry all over the world. Patents, articles, reports, etc., will be found abstracted in this section. The accumulative index feature will be continued.

3. Service for the Commercial Man

This department, entitled "Ideas for the Man Who Sells," will be continued and contain, as heretofore, ideas of practical value relating to the manufacture of gas and gas appliances. There will also be included in this department examples of advertising copy, showing the manner in which various gas companies prepare their advertising copy on gas merchandise.

4. Gas Wrinkles

There will be published from time to time a number of practical suggestions, which have hitherto not appeared in print, of value to the technical man.

FOR YEAR 1926

5. Industrial Gas Articles

The American Gas Journal will, as heretofore, publish the latest and authentic descriptions of applications of gaseous fuel in the various industries.

6. Fuel of the Future

This series, which is now concerned with the use of gas in the non-ferrous metal industry, will be continued, and thereafter will take up the discussion of the use of gas in the ceramic industries, etc.

7. Articles on All Phases of the Gas Industry

The American Gas Journal will continue its policy of publishing articles on all phases of the gas industry, prepared by the leading gas men in the field. Many interesting articles are now available and others will be forthcoming relating to various matters of interest to the gas man. It is the editorial policy of the Journal to make the paper as comprehensive as possible and to include in it as far as possible in each issue something of interest to every gas man.

8. Conventions and Meetings

The Journal will contain, as usual, reports of all conventions and meetings of the State Associations, etc., that take place during the year. Articles, papers and addresses of importance and interest, delivered at these meetings, will be published in the Journal. The American Gas Journal will, as usual, cover the proceedings of the 8th annual convention of the American Gas Association, which will be held in Atlantic City, in a series of five convention dailies.

9. Translations

From time to time, there will appear as usual translations of important technical articles appearing in various foreign journals and written by the leading technologists of Europe. Only such articles are translated that have a direct bearing on the American gas practice, and that contain information of interest and importance to the American gas engineer.

10. Market Reports and News

The news section of the paper will contain all the important news items of the week pertaining to gas and its allied interests. Market reports will also be given at stated intervals.

TRAINING AND COMPENSATING SALESMEN IN SMALL TOWNS

(Continued from page 5)

Holding Business Against Competition

In addition to these two features, there is still a third one which is becoming more noticeable and more important daily, and that is the fact that he should be paid for holding business against competition. You have probably noticed, as I have keenly, how much more attractive the electric range and even the oil range is being made each year. Our competitors are using mighty good selling schemes to market their wares. We must keep gas appliances in our consumers' homes if we are going to sell them gas. As our men meet this competition and frustrate it, thereby holding our business and our revenues, they accomplish things that may show neither appliance sales nor an increased revenue. and yet they have done something that should be paid for. When you are drawing up your schedule of compensation, please don't overlook this last fact.

And so, to sum up this question of compensation briefly, most any arrangement that insures a man of a good income is liberal enough so that you can attract high-class, clean-cut, good appearing representatives, one that will pay him for, first, holding our present business, second, adding new business, third, on the ratio of appliance sales that he makes, you will accomplish what you set out to do.

Financial and Mental Compensation

Under the heading of compensation I think it is well to refresh in our minds the fact that there are two kinds of compensation, first, financial, which we have already discussed, and second, mental. Many times men appreciate mental compensation as much as they do financial. All of us like to see that we are making progress. All of us want prompt and ready recognition of good work and all of us want to see ourselves stand well up in the list of men that are doing things. We handle this problem of mental compensation through various mediums; the first and most important is the blackboard upon which each man's results are recorded daily, at the morning meeting. At the end of each month the standing of all representatives is reported in the New Business Bulletin, an organ which covers all New Business departments of the Doherty organization. Each man's work is reported in this bulletin every 30 days. Good work is commented on and as each man's ability increases and his results multiply they are carefully noted in this booklet. In addition to the Bulletin, the Doherty News, which is a general company publication, records unusual or spectacular pieces of work with an ample use of pictures. Through these three mediums our men are constantly watched and are readily complimented for good work. They appreciate this kind of recognition, as I have said before, pretty nearly as much as they do the money they receive from the job.

Well Informed, Trained and Well Paid Men

In conclusion, I want to state that I believe it is impossible to lay too much stress on the fact that our representatives should be well informed and well trained and well paid. As we send these men out among our customers we are placing in them a real responsibility. We insist that this representation be of the very highest type. A representative of a gas company has hundreds or thousands of prospects probably more closely grouped than other businesses. His conduct must be above reproach to avoid disagreeable reaction 24 hours a day. He is to work closely with the most valuable part of our business and that is the customer. A consumer connected to the company's lines is usually worth between $200 or $300, say $250 for a good round figure. When a man makes 20 calls a day, and he should do that in a full day, he has had the making or the breaking of an investment value to the company of approximately $5,000.

A customer can be lost easily. The responsibility is clearly on the shoulders of the management of every gas company to see that each employee understands this responsibility as he deals with every customer. To fit all employees to deal with customers properly they must be trained and they must be informed. You are the man to do the informing. Don't be afraid to talk to all of your employees about the company, about its policies, about its aims. Don't be afraid to tell them how hard we are all working to make their company a better one. Be sure to tell them the many little things that occur every day in this great business of ours to make life more livable for our public.

Conclusion

I have watched eagerly the rapidly growing interest in this subject on the part of the American Gas Association. We are treating our public better and better every day and as a result our public do appreciate us more. But the job isn't over with yet. We must continue to develop our men steadily. It seems to me that as these new ideas which we are hearing about on every hand of better relations with the public are established and put into working form that the gas industry of the United States is bound to enter into a period of prosperity the like of which they have never dreamed.

I want to assure you that it has been a pleasure to put down my thoughts on this subject and though I want to assure you that if there is anything that I can do to make this paper clearer at any time, it will certainly be a pleasure to have you call on me.

GAS MERCHANDISING

(Continued from page 6)

plan and all radiant gas heaters could be purchased by making a down payment of but $1. Notwithstanding the fact that retail business in general in the Middle West has been rather slow, this company has made a very good showing for the year. In staging appliance sales, this company makes a complete tie-in—newspaper, company trucks, store interior, gas bills and windows all tie into the appliance being featured. In the newspaper advertising all appliances are advertised, with a main play-up of the major appliance and the down payment. This idea might be worked over into a New Year sale.

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

OVERHEATING AND REACTIVITY OF COKE

SEMI-COKE is heated to the temperatures 600, 800, 1,000 and 1,200 deg. C. and the heating is continued for 10, 20 and 40 hours. From these tests results are obtained that indicate a sharp difference between after-heating and overheating. The after-heating of semi-coke is connected with evolution of gas and at the same time a shrinkage of the mass of coke is observed. This results in a rise in its true specific gravity as well as a reduction in its reactivity.

However, in overheating the coke, no change was observed, either in its true specific gravity or its reactivity. The determination of the reactivity of the coke is accomplished in part by means of a combustion method.

For further details see Stahl and Eisen, 1925, page 1131.

GASIFICATION OF SOLID FUEL

A GAS-PRODUCER, adapted also for the extraction of iron and other metals as described in British Patent No. 229,331, is charged alternately with lump and briquetted small fuel, and finely powdered fuel is injected at the tuyeres. Metal compounds and fluxes may be admixed with the fuel either at the top of the shaft or at the tuyeres. The air blast, which may be preheated and enriched with or replaced by oxygen, is supplied through a ring of tuyeres situated below a second ring for the supply of powdered fuel, etc., and steam or carbon dioxide, etc., may be injected through a third ring of tuyeres. Distillation products are withdrawn from the top of the shaft and passed through a collector and dust separator, to a by-product recovery installation. The producer gas escapes through a flue above the tuyeres and passes through a dust separator to a heat interchanger for preheating the blast; some of the gas may be burned at the inlet of the heat exchanger. At the base of the shaft is a crucible with tapping-holes for molten clinker, slag and metal.—British Patent No. 237,883.

MAKING COAL AND WATER GAS IN THE VERTICAL RETORTS

A PROCESS for the manufacture of coal and water gas is patented in German patent 374,-019, this process being carried out in a vertical retort of ordinary construction. The steam that is necessary for the production of the water gas is introduced into the retort, which is filled completely or almost completely with the coke produced by gasification. The new process has particular economical advantages and consists essentially in introducing the steam that is required for the water gas manufacture at the beginning of gasification. In this way the retorts can be completely discharged or can contain a part of the coke which is obtained from a previous charge. In the latter case it was found that the water gas production was particularly favorable especially when the residual incandescent coke, which is left behind after the retort has been discharged, comes into contact with the steam at its point of entry. The result, then, is that the entire mass of coke is actually sprayed with the steam.

CARBONIZATION OF FUELS IN ROTARY RETORTS

DETAILED estimates are made of the cost of carbonization of four different coals and an oil shale in rotary retorts of the Thyssen type. The calculations apply to a plant of five retorts, each with a through-put of 90 tons per day. The cost per ton is compared with the total value of the products of carbonization, based on prices ruling in the Ruhr district in May, 1925. A working profit is obtained only when the low-temperature tar is refined before selling, and is greater the further the refining is taken. The profit is increased also by recovery of the light oils and of the easily liquefiable hydrocarbons ("Gasol," a mixture of liquefied ethylene, ethane, etc.) from the gas. The process gives better economic results for the carbonization of lignites than of ordinary gas coals; the results for an English cannel coal are particularly favorable. The working advantages of the rotary retort are briefly outlined.—(Brennstoff-Chem., 1925, 6, 153-158).

VOLATILE CONSTITUENTS FROM LOW-TEMPERATURE COKE AT DIFFERENT TEMPERATURES

THE volatile products evolved when a low temperature coke is heated in vacuo and at atmospheric pressure in steps of 100 degrees from 500 to 1000 degrees have been examined. The coke from a Lohberg flaming gas coal, carbonized at 500 degrees, was used. No more tar was given off on further heating. At both pressures there was a maximum gas evolution at 700 degrees. The gases consisted mainly of hydrogen. No unsaturated hydrocarbons were present. The paraffin hydrocarbons were evolved in greater quantity, but with a smaller content of the higher homologues, at atmospheric pressure than in vacuo. The water formed on heating in vacuo made up about one-third of the total volatile matter.—(Brennstoff-Chem., 1925, 6, 301-303).

THE UTILIZATION OF GAS

(Continued from page 2)

producing kerosene, gasoline and lubricating oil from petroleum are developed.

Coal, with its abundant deposits, obviously is to be the basic fuel of the future. Gas is the only product of coal which economically is available for fuel. Raw coal is not flexible and will not adapt itself to the various operations, while electricity is far too expensive. Therefore, the fuel of the future from the utilization point of view must be a gas derived from coal.

The Need of Centralization in Fuel Production and Distribution

The central station gas company is the logical agency for the production and distribution of gas for all heating purposes. Gas cannot be made economically in small units—the by-products which represent a substantial credit to operation must be of sufficient quantity to justify their recovery. Moreover, gas manufacture is a highly technical manufacturing business and requires skilled men. Concentrated management and diversity of load make the gas company an economic unit.

Why Should Gas Be Used in the Home and in the Factory?

In the Home:

In choosing a fuel for househeating purposes the American people are most interested in its advantages from the standpoint of comfort. Gas, because it is able to respond instantly to the demand for heat, can satisfy this requirement better than any of the other fuels. Moreover, by virtue of being able to meet the fluctuating demand, almost twice as much heat can be produced in a gas-fired furnace as in a coal-fired furnace.

Actual installations show that 15,000,000 B.t.u. of city gas will displace a ton of anthracite coal. At this rate, if a home owner could purchase gaseous fuel at $1 per million B.t.u., it would not cost him any more to heat his house with gas than it now does with anthracite coal at $15 a ton. Consider the advantages besides actual cost which he would derive when using gas. There would be no coal shoveling to do, no ashes to remove, no fires to watch—the system would be controlled by a simple thermostat which would make it absolutely automatic and easy to handle.

The economics back of the domestic househeating burners are simple. Bituminous coal which is used in gas-making seldom costs over $5 a ton. The higher grade coals that are used for heating homes cost as high as $15 to $20 a ton. The heating value of both coals is about the same.

The gas company can transform coal into gas, which in turn is transformed into useful heat by the consumer, with a much higher efficiency than the consumer can transform his coal into heat direct. It is true that the gas company has other charges to add to the bare cost of manufacturing, but the margin is sufficient to make it possible for it to supply the consumer with gas at a price which he can afford to pay and which will net the gas company a fair profit. The present rates appear to be very high and preclude the possible opportunity for this business, but the student of economics will realize that the true reason for present high costs is due to the small volume of gas sold per customer. Increasing the sale per customer will reduce these costs, due to the fact that all the overhead charges will be distributed over a larger volume of sales, resulting in a reduction of the fixed charges per unit of output.

In the Factory:

Today the character of our industrial heating operation is fast emerging from the category of an "art" to that of a "science." The average heating process today is no longer dependent upon the traditions of the past and the intuition and general skill of the workman. The great progress we are making is due to the application of scientific control and scientific methods which definitely prescribe the physical and chemical conditions under which we can obtain the highest quality standards of production at the lowest possible cost.

It has been found that many heating processes did not produce the same desirable results when placed in commercial operation as were obtained in the research laboratory, due chiefly to the inability to control in the large industrial furnaces the combustion of fuel in such a way as to definitely regulate at all times the furnace temperature, uniformity of heat application, furnace atmosphere and other considerations necessary. This lack of control has been due primarily to the great difficulty involved in mastering the technique of efficient combustion and uniform heat application of solid and liquid fuels.

Gas, on the other hand, is an ideal fuel for heating because the development of its heat energy and the application of that heat can be most accurately controlled. Gas delivered at a furnace is in the proper condition for the immediate development of heat energy.

The industries, therefore, are interested in a fuel that can reproduce on a production scale the quality of product secured in the laboratory. With gas such control can always be exercised and in addition it meets the industries' other requisites, economy and permanency of fuel.

Scientific Utilization of Gaseous Fuel

To obtain all the heat contained in a unit volume of gas and to attain the highest flame temperature in the combustion of a gaseous fuel for any given inlet temperature of the air and gas depends chiefly upon the quantity of air supplies, the intimacy of

the mixtures of air and gas and the amount of heat dissipated during the period of combustion.

To burn a unit volume of gaseous fuel of a definite B.t.u. value requires a definite amount of oxygen which is obtained from a definite amount of air. Too much air means wasted energy in heating the surplus; too little air allows unconsumed fuel to escape. Correct proportioning is not only important from the point of view of efficiency, but it is essential for obtaining the desired furnace atmosphere. Equipment which provides for automatic proportioning of air and gas has been one of our greatest needs in the past. Systems to provide for this accurate control have been developed and are now serving in thousands of industrial plants all over the world.

In order to obtain complete combustion of the gas and air it is necessary for them to be intimately mixed. It is of interest in this connection to note that researches by Bairstow & Alexander in 1905 indicated that mixtures of air and gas could be allowed to stand as long as 17 hours without becoming homogeneous. It is, therefore, necessary to utilize some definite means of positively mixing the air and fuel before combustion occurs. The simplest and most effective type of mixer is the venturi type, in which the expansion of one of the gases causes the absorption of the other.

Definition of Combustion Zones

Combustion zones must be so designed as to favor to the highest degree rapid combustion. Their design is therefore controlled by two considerations: First, to submit the entering mixture to the highest possible temperature, and, second, to baffle or retard the velocity of the mixture to the point where combustion will have been completed before leaving this zone. The rate of combustion, therefore, is not affected by any mixing of these gases after leaving the combustion zones with inert gases which may be present in the furnace chamber.

The very nature of the combustion of fuel tells us that the burned gases must leave the heating chamber at as high a temperature as the temperature of the chamber itself and in some cases these flue gases carry away as much as 60 per cent of our total heat. We have, however, a means of utilizing this heat by the application of recuperators or regenerators. We find regenerators installed on many of our large industrial furnaces, such as open hearth and glass melting furnaces, but we must bear in mind that regenerators were not installed on these furnaces because of the desire to save fuel primarily, but were considered necessary in attaining a high operating temperature which could not be obtained by the use of producer gas.

Up to the present time very little use has been made of recuperators. However, at the present time there are some very desirable refractory and metallic recuperators on the market, the former being desirable for furnaces which operate at usually high temperatures, and the latter for small furnaces. From now there should be a rapid growth in the use of these forms of equipment for all heating operations.

Furnace Efficiency

The technical world is just beginning to appreciate what can be accomplished in furnace efficiency with proper insulation; to realize what a difference the thickness of an inch or two in a furnace wall will do toward reducing conduction losses. In the past the insulation of high temperature furnaces has been limited to a great extent because of the necessity of allowing a certain amount of heat loss to keep the inside surface of the refractory itself from getting too hot and melting down. Today, however, the development of high temperature refractory substances is placing the industry in a position where it can insulate furnaces properly and cut down heat losses tremendously.

In the combustion of gas with the greatest effectiveness there is one other consideration which can very often be used to great advantage. By recirculating a portion of the hot flue gases which leave the furnace and mixing them with the air and gas for combustion, the burning gases will actually represent the combustion of the air and gas mixed with a certain percentage of the flue gases. This means that the cutting action and intensity of the flame will be cut down, the volume of the gases in the furnace increased, and as a result higher rates of heat transfer and more effective circulation of the hot gases obtained. Overheating or localization of heat are thus avoided to a large extent and better conditions of heat uniformity produced.

It thus appears that gas has the inherent characteristics of the ideal fuel and is of such a nature that in its utilization advantage can be taken of certain scientific principles which effect great efficiencies and economies. As the public gradually becomes educated to the use of this remarkable fuel its use will become more and more universal until the gas industry is able to fulfil its rightful responsibility and supply the fuel for all heating operations, both in the home and in the factory.

Opportunities in the Gas Industry

From the details given in this paper it is obvious to anyone that fuel utilization in the home and in the factory will in the future be limited to the fuel which gives the maximum possible efficiencies consistent with the greatest convenience and economy.

It is also obvious that while electricity is perhaps a more convenient fuel to use than gas, because of the economic factor, it is not an ideal fuel for heating purposes, and that the fuel of the future must be gas.

The period of transition which has been necessary to bring to light the importance of gas and its economic advantages has extended over a long period of time, but impetus to this transition will be given every day as gas companies become more and more recognized as the logical agency for fuel supply, and it will not be long before gas will take its rightful position as the fuel for all heating operations.

The fuel bill of this country is in excess of two billion dollars a year. What an opportunity this implies for the engineers who will accept the responsibility of interpreting the fuel needs of the home and of industry and supply the talent which will make possible the proper manufacture, distribution, sale, etc., of this huge volume of business; what a worthwhile career is open to those who are now specializing in gas engineering in preparation for their life's work!

There is no other branch of the engineering profession at the present time which offers as great an opportunity for progressive and creative work as the gas industry. All those of you who investigate the potential opportunities of this field and decide to enter it will find that you have chosen one of exceedingly great promise.

PROBLEMS IN THE GAS INDUSTRY

(Continued from page 8)

It may be a startling thought to some of our members that gas can and will be sold in future at prices one-half to one-quarter that of our present residential tariff, which lower schedules will be made entirely possible and profitable by reason of the larger volume sold to the individual consumer. To make this situation plain it is only necessary to consider briefly the elements in our cost of service.

The well known four-part rate consisting of customer cost, commodity cost and production and distribution demand, will give the true cost of serving consumers using different volumes of gas under various conditions of load and demand. Considering, for instance, the consumer costs, which are generally in the neighborhood of $12 to $15 per consumer per annum, for the larger companies, the cost per thousand cubic feet of sales for this element of expense will reduce from 60 to 6 cents when the volume of sales increase from 20,000 per annum to 200,000 per annum, the former figure being the usual residential consumption, the latter being in connection with the heating of the larger homes. In case of very large industrial consumers using 2,000,000 feet per annum, this figure would be .6 cents per thousand cubic feet of sales.

The Cost Problem

In this one item of cost alone, therefore, it should be possible to reduce the tariff by 40 to 50 per cent of the usual price charged when gas is used in smaller quantities. The other components of cost are similarly affected by the varying conditions of service, principally in connection with the loading up of existing investment, idle at certain periods. Enough has been said, however, to point out that given the proper rate structure untold possibilities open themselves up for the merchandising of gas on a large scale basis.

The picture I have just given you, therefore, is a legitimate vision which should offer incentive for a great development of our business.

The part which our association has to play in this picture is a very important one. Probably the most important study upon which will depend the progress of our industry will be that just briefly touched upon. That is to say, a study of the cost of service in order to establish proper rate structures such as are now enjoyed by our sister electrical industry.

Comparison Between Gas and Electric Rates

To appreciate the existing handicap upon the gas industry of antiquated rates one has only to make the comparison between the usual gas rate and electrical rates. It will be found that while the highest step of a gas tariff will only be reduced by 50 per cent at the most, or a ratio of 2 to 1, the electrical industry sells current for prices as low as 5 per cent of the maximum tariff, or a ratio of 20 to 1. The flexibility of the electrical tariffs are hence something like 10 times greater than that of the gas industry.

What is keenly needed in connection with our rate structure is a different attitude toward the question. It would seem that proper confidence in the soundness of a departure from our existing rate schedules can only be acquired after a good deal of exchange of opinion between member companies. It would certainly make things much easier for individual companies to put through an improved rate structure after the fundamentals have been properly elucidated and discussed through the medium of our association, and the public and regulatory bodies have become familiar with the desirability and soundness of such changes.

Development of Appliances

Even, however, with a favorable attitude for the merchandising of our product, the industry is still concerned with practical means for the utilization of our commodity. That is to say, appliances must be improved and in some cases developed to enable the commodity to be used to advantage. This question of appliance development is a problem only second to that of a proper rate structure. It is regretable that today our industry suffers from the lack of such agencies as have been primarily responsible for the amazing development of the electrical industry. I allude to those large manufacturers such as the General Electric Company and the Westinghouse Electric Company, who, with their magnificent research laboratories and resources of capital for development, have made electricity the marvel of the age.

Publicity

Let us not believe, however, that with all the matters just mentioned properly taken care of that our commodity will merchandise itself with no effort on our part. It must always be remembered that proper publicity and advertising are essential to the development of any industry, and in this respect the gas industry has been singularly backward, and the Pacific Coast has not been an exception. It is quite a common thing to find people eager to install electrical appliances without knowing anything of their merits or demerits, simply because they have been sold on the electrical idea. They have developed the electrical consciousness. We must develop the gas consciousness. Notwithstanding that our association has for the past two or three years given the matter of co-operative publicity consideration, yet the fact still remains that nothing of a co-operative nature is even at the present time contemplated.

The above matter—rate structure, appliance devel-

opment, regulation and publicity—would seem alone to present problems of sufficient magnitude and importance to fully engage the best minds of the industry, and yet I have not touched upon the technical problems of manufacture and distribution, nor the great importance of by-product recovery.

Indeed, when matters of such fundamental importance seem to be awaiting solution, one cannot but marvel at the self-sufficient attitude of those who would attempt to solve these problems unaided. Only the supreme egotist could escape being impressed by the impossibility of one man or one small group of men making any substantial progress unaided. Short-sighted, indeed, must be the man who would grudge to our association contributions of time and money for the solving of problems upon which the very existence of our industry depends.

Co-operation With A. G. A.

Our efforts to affiliate more closely with the American Gas Association during this administration and to secure from them a measure of financial support have not been brought to a successful conclusion, although their attitude is very appreciative of the correctness of our suggestions, and they seem very desirous of being helpful. It is my recommendation that the committee be continued for the coming year and that the matter be presented at the forthcoming convention of the American Gas Association by a strong delegation from the Pacific Coast and that an effort be made to make the conclusions effective during the forthcoming fiscal year.

GAS IN A MOTOR TRUCK PLANT

Gas Used for Operating Portable Rivet Heater and Parts Cleaning Vats

Charles W. Geiger

After several years of preparation and ten months of active construction, the most modern motor truck and bus plant in Northern California was opened recently in San Francisco. Typifying the growth of the truck industry and developments in the direction of continuous transportation, the new truck building is expected to set new maintenance standards.

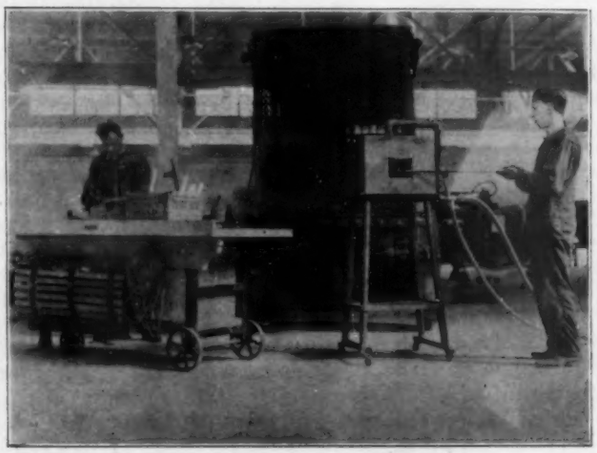


Figure 1

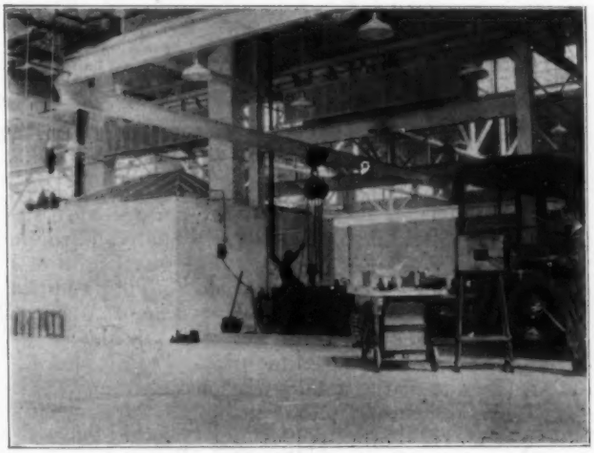


Figure 2

A feature of the plant is the special, gas-heated, parts cleaning tank shown in figure 1. The special gas heater was built by the Pacific Gas and Electric Company and can be seen just to the left of the workman. By means of this equipment parts are cleaned in from three to fifteen minutes.

Another interesting feature is the fact that gas is piped throughout the plant for the use of portable, gas-fired, rivet heaters, one of which is shown in figure 2. This heater is mounted on four pipe standards carrying small casters, enabling one man to move it to any part of the plant; thus the heater can be moved to any job, instead of moving the job to the heater. In this way the work is greatly facilitated.

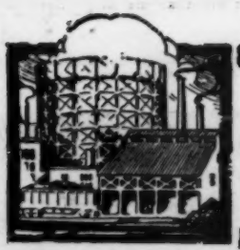
DOES MOVING DAY PAY DIVIDENDS?

In spite of the fact that moving day brings nothing but trouble to the gas company, John M. Roberts, of the Peoples Gas Light and Coke Company of Chicago, thinks that on the whole it pays fairly good dividends to the community.

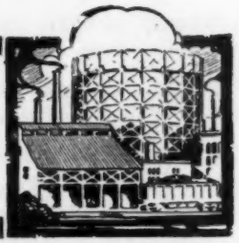
Mr. Roberts, who, as superintendent of applications of the Chicago company, ought to know what he is talking about, says that if the gas man will only forget his own worries in the endeavor to keep his reputation for service up to the required standard, he will see distinct benefits to the business of his town or city in these periodic migrations.

"Does moving pay dividends to business enterprises?" he asks. "Absolutely yes, for you can no more fit a square peg in a round hole than cart your household goods from one domicile to another and fit them in as they were. New furniture and new house fittings must be procured, therefore better business.

"Even better citizens, for there are new resolutions as to prominence in the new neighborhood, new affiliations, and even church-going is considered, for there are new clothes. The gas compay should give service without stint to help these new customers who are trying to better themselves and the business of the city."



NEWS OF THE GAS INDUSTRY



EIGHT PUBLIC UTILITY COMPANIES MERGE

Amalgamation of Concerns in State of Connecticut Is Announced

New York, N. Y.—Announcement is made of the amalgamation of eight Connecticut public utility companies, serving a population of 650,000 in such industrial districts as the Naugatuck Valley, the cities of Waterbury, New Britain, Meriden, Norwalk, Putnam and Bristol, and including the entire eastern section of the State, taking in New London and Norwich. The merger is under the auspices of the Connecticut Electric Service Co., of which Randall Morgan is president, and embraces the following companies: Connecticut Light & Power Co., Eastern Connecticut Power Co., Meriden Gas Light Co., Meriden Electric Light Co., New Milford Electric Light Co., Woodbury Electric Co., Westport Electric Co. and Bristol & Plainville Electric Co.

Financing to be announced in the form of an issue of cumulative preferred stock by the Connecticut Electric Service Co., the holding concern for the consolidation, will supplement a step or movement which has characterized the rapid progress of public utilities in the last year or two. Eight companies operating in one state are now joined in the interest of economical operation. In connection with the merger, it is pointed out that the consolidation does not represent a sale of properties to new interests. The same management will continue to direct the integrant companies. Randall Morgan, the president of Connecticut Electric Service, is also chairman of the executive committee of the United Gas Improvement Co. Stockholders of the largest units in the merger, Connecticut Light & Power Co. and Eastern Connecticut Power Co., are exchanging their old shares for stock in the new company. Stockholders of Connecticut Light & Power are also supplying additional cash in part payment for smaller companies acquired.

For the 12 months ended November 30, 1925, output of electricity was 418,515,065 kilowatt hours and gas sales 759,391,200 cubic feet. Consolidated earnings for the year ending December 31, 1925, after charges and preferred dividends of operating companies, will amount to about $1,501,656, more than 4.17 times the dividend requirements of $360,000 on the preferred stock to be issued. Using present volume of sales and demands for additional service as a basis, similar profits for 1926 are estimated at $1,666,894.

After giving effect to the proposed financing, capitalization of Connecticut Electric Service Co. will consist of 90,000 shares of no par preferred stock and 625,000 of no par common. The senior issue will receive dividends of $4 a share annually, and will be convertible, share for share, into common.

Greenwich Gas Co. Is Organized

Greenwich, Conn.—Construction of gas mains in Greenwich to supply a major portion of the buildings in the town is to be started in the immediate future, it was officially announced recently, when publicity was given to the filing at Hartford of a certificate of organization of the Greenwich Gas Co., a corporation chartered by the last General Assembly.

At the same time it was made known that the Connecticut Railway & Lighting Co., the Connecticut Light & Power Co. and the Greenwich Gas Co. had filed with the Public Utilities Commission a petition requesting permission for a transfer of all rights which the Connecticut Railway & Lighting Co. has in a previous charter covering the town of Greenwich, together with all the rights of this company in a few gas mains now in the streets of the town.

No date has been set for a hearing on the petition. In the certificate of organization of the gas company, Lewis L. Field, of West Haven, is shown to have been elected president and treasurer, and Nelson R. Durant secretary. The owner of record of a majority of the stock is given as Putnam & Storer, Inc., of Boston. When the petition for a charter was before the General Assembly some objection and much discussion developed over certain features in the proposed charter. It was claimed that the rights asked for were "too broad," and that this company might acquire by purchase other gas companies in the State. The bill was withdrawn and another offered, which was approved.

1925 Extensions to Gas Consumers to Cost $800,000

Dallas, Texas.—Extensions of the Dallas Gas Co. service mains within the metropolitan area during the year ending January 1 will total $800,000 in cost, H. C. Morris, general manager of the company, has announced.

Mr. Morris said gas connections will have been provided in 1925 for 6,000 additional consumers. At the end of December last year the consumers totaled 51,166. By the end of this year the number will be about 58,000.

Power Company Buys Gas Plant

Dover, N. J.—Announcement has been made that the New Jersey Power & Light Co. has acquired the Washington Gas Co. and that the gas plant will be operated by the Dover concern. Recently the power company bought the Boonton gas plant and there are persistent rumors that the local gas manufacturing plant may eventually be merged with the lighting company's constantly growing system.

Southern California Gas Co. Gives Banquet

On Saturday evening the Southern California Gas Co. gave a banquet to those who have been in their employ for five years or longer. This is an annual event which is growing in importance and size as the years go by. Over 500 persons, employees with their wives, were present. In this group were practically every district manager and head of a department in the company, showing how the company has been built up from among its own ranks.

One of the interesting features of the program was the giving of Service Pins and Pension Certificates. Those who have been with the organization five years or longer are eligible to enrollment under the Pension Plan of the company, which provides in a sure and carefully planned method for the retirement of employees. This plan also carries with it disability and insurance benefits.

A. B. Macbeth, executive vice-president of the company, spoke on the achievements of the past year. Over 19,000 customers were added to the lines; 250 miles of mains were laid and various additions were made to the plans and equipment of the company to take care of the constantly increasing business. Two new transmission lines were built, one from the Ventura gas and oil fields and one from the new Inglewood field, to the east of Culver City. At both these places compressor stations were built to provide the power for forcing gas through the lines. A compressor station was built at Brea and another compressor plant erected at Taft. An office was built and opened in Bellflower. A total of approximately $3,000,000 was invested in additions and permanent improvements.

Music was furnished by the company orchestra and by other employees.

Gas Works Wants to Raise $108,000

Binghamton, N. Y.—Charles E. Bennett, vice-president of the Binghamton Gas Works, has filed application with the Public Service Commission for authority to sell approximately $108,000 of 6½ per cent preferred stock in the company.

The proceeds from this sale will be used for reimbursement of the company's treasury, from which large payments have been made for construction, extension and improvements during the last year.

If the order is granted, as expected, it will place at the disposal of the company about $108,000, for construction, extension and improvements the coming year. It is reported that the company is considering plans that call for an outlay of more than $200,000 next year.

The closing year has been one of the most prosperous in the company's history and the management looks forward to a still greater prosperity next year. The steady growth of the community makes necessary the extension of the company's lines and other improvements to the system.

The company's board of directors will meet next Monday and declare 1¾ per cent dividend, or about $3,596 in cash, payable to Binghamton and vicinity holders of the last stock issue. This stock draws 7 per cent annually.

Dayton Gas Co. Capital Lower

Columbus, O.—Capital stock of the Dayton Gas Co. has been reduced from $3,000,000 to $1,247,900, according to a statement recently filed at the Secretary of State's office by George Light, vice-president, and E. D. Batdorf, secretary. The board of directors cancelled 17,521 shares of preferred stock of $100 each, redeemed by purchase by the corporation. The capital stock of the company now consists of $1,000,000 common and $247,900 preferred. The shares are $100 each.

General Gas & Electric Co. Changes Designation

Albany, N. Y.—General Gas & Electric Corporation, L. H. Tyng vice-president, chartered under Delaware laws to deal in securities with capital of 1,700,000 shares non par value, has filed a certificate of statement and designation in the office of the Secretary of State to enable it to do business in New York State. New York office is 50 Pine street, Manhattan. Pendleton, Anderson, Iselin & Riggs, 25 Broad street, are attorneys for the corporation.

General Gas & Electric Corporation, chartered under Maine laws, has surrendered its certificate of authority.

Henry Obermeyer Resigns from A. G. A.

Henry Obermeyer, assistant secretary of the section and editor of the American Gas Association Monthly, leaves on January 15, 1926, to take up advertising work with the Consolidated Gas Co. of New York. His place will be filled on January 11, 1926, by Howard F. Weeks, associate editor of the Gas Age-Record, New York City. Mr. Weeks has had both magazine and newspaper experience and comes to the position fully equipped to carry on the work.

We are sorry to lose Mr. Obermeyer, but we are assured of his continued co-operation in the Section's work. He will give Mr. Weeks his personal assistance for the next 30 days or so and we are confident that the news and magazine activities will go along just as well as they have in the past.

Peoples Gas Expenditures

New York, N. Y.—The Peoples Gas Company plans to spend $6,000,000 in developing new producing fields in West Virginia, according to H. C. Cooper, chief engineer, when testifying before the Public Service Commission on an application for higher rates. Reproduction cost of the company's property was placed at $27,000,000.

Southern Counties Gas Bonds

San Francisco, Calif.—Southern Counties Gas Company of California has applied for authority to issue and sell $2,500,000 par value of its "series 1945" general and refunding mortgage gold bonds, at a price to yield not less than 96 per cent of par value thereof, plus accrued interest, and to use the proceeds derived from the sale of said bonds to reimburse its treasury for capital expenditures.

Gas Merger Approved

Albany, N. Y.—The Public Service Commission has approved the purchase by the Central Hudson Gas & Electric Co. of Poughkeepsie of the Wappingers Electric Corporation of Wappingers Falls. The Commission's engineers and accountants fixed a valuation upon the property of $206,620.50 and directed that the difference between that figure and the purchase price of $300,000 be amortized over a period of years extending to 1925.

A Substitute for Matches for Lighting Gas

The Stevenson Distributing Corporation, 119 E. 27th street, New York, recently issued a folder describing the "Shoot-a-Lite" safety gas lighter.

Shoot-a-Lite is a gas lighter pistol made of solid steel, whose inner mechanism is masterful in its design, strength, simplicity and action.

It is beautifully made and even with rough usage lasts for years without getting out of order.

It shoots a light in full volume just where the light is wanted and in the most out-of-the-way and hard-to-get-at places.

It takes the place of a match for oven, gas, water heater, gas fire log, etc.

Mr. R. S. Wood, president of the company, states that the spark will not scratch the human skin, nor paper, fabric, wood or any other substance other than highly inflammable gases or vapors. It is designed to be used in place of matches in the home which has a gas service.

A copy of the leaflet will be sent on request.

Opens Chicago Office

The Peerless Heater Co., Pittsburgh, Pa., announce that they have established an office and warehouse at 654 West Lake street, Chicago, where they will carry a full line of boilers, repair parts, etc. The gas boiler department will be in charge of Mr. E. J. Caspers.

Panama-Colon Gas Co. to Extend Service

With the exception of Fort Sherman, entrenched behind the waters of Colon Bay and the township of Gatun, which is seriously menaced, the entire Atlantic side will be completely "gassed" by the latter part of February or early in March, according to S. Paul Vecker, vice-president and general manager of the Panama-Colon Gas Company.

Contracts have been entered into between the United States Government and the Panama-Colon Gas Company, whereby the latter will extend its gas system to take in France Field, Fort Davis, Fort Randolph and Coco Solo, thus freeing the Army and Navy housewives from the tyranny of the old-fashioned, messy and hot coal and wood stoves.

Already the United States transport Edgemoor is on its way to the Isthmus with 50,000 feet of four-inch high pressure pipe, and as soon as this material is unloaded and made available the work of laying the mains will be begun in earnest by a force of more than 200 men, mostly Panamans, in virtue of the gas company's policy of preferring native to any other labor.

To Cost About $100,000

It is estimated that these new installations will cost approximately $100,000, of which $25,000 will go towards the improvement and extension of equipment at the Colon plant, and $75,000 for the installation of the new distribution system to cover the points named.

Embraces All Atlantic Side

With the extension of the system to Fort Randolph, the home of the Atlantic Side Coast Artillery, and to Coco Solo, Uncle Sam's submarine base on the Isthmus, all available and potential business on the Atlantic side, with the exception of Gatun, will have been corralled by the Panama-Colon Gas Company, whose general manager seems determined that no nook or cranny of the Isthmus shall forego the convenience of using gas for fuel.

Plan New Bond Issue

The Panama-Colon Gas Company plans to finance this expansion by means of a new local bond issue, as an encouragement to further efforts for locally owned enterprises. Though this plan has not yet been publicly advertised in the press or otherwise, more than $64,000 has been spoken for by folks who subscribed to the recent bond issue, which covered the extension of the gas system in the Canal Zone and by those who, too late, sought to subscribe after the first issue was over-subscribed. The holders of these bonds received such excellent results from their investments that on being advised by Mr. Vecker of his new bond issue they again offered to subscribe, while those who were disappointed by the over-subscription of the first bond issue took care not to be too late again, and subscribed immediately upon being tipped off.

The record of the Panama-Colon Gas Company is, without doubt, one of which any business man may well feel proud. Its career has been featured by one success after another and it is not 10 years old yet.

Need Artificial Gas to Maintain Natural Gas Supply

Hornell, N. Y.—The time is rapidly approaching when artificial gas will have to be added to the natural gas that is supplied Hornell if the service is to be maintained, according to Justin B. Bradley, head of the Hornell Gas Light Company. Slowly but surely the supply of natural gas is dwindling.

According to Mr. Bradley there was a time when wells drilled in the fields of northern Pennsylvania had a rock pressure of from 300 to 500 pounds, but today the average well has between 20 and 30 pounds. This means there must be pumping stations all along the line to maintain the pressure.

And in addition to this the supply itself is disappearing. Whereas a few years ago a few wells drilled each year would more than maintain the necessary quantity, now dozens of wells have to be sunk every season and yet the demand cannot be met.